Dynamic Bandwidth Allocation for Switching FCAE-1553 Network in Avionics System

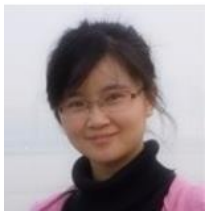
Yueying Zhan*, Liqian Wang**, Shaojun Wu*, Suzhi Cao*,Jianhua He*

** Key Laboratory of Space Utilization, Technology and Engineering Center for Space Utilization, Chinese Academy of Science, China ** IPOC, Beijing University of Posts and Telecommunications, China*

zhanyueying@csu.ac.cn, lqwangwang@bupt.edu.cn, wushaojun@csu.ac.cn, caosuzhi@csu.ac.cn, hejianhua@csu.ac.cn

***Abstract*—In order to meet the requirement of space payload system and the data transmission, the data business type was divided into periodic business, burst business and strong timeliness business. After analyzing the characteristics of the three kinds of business, a scheme of dynamic bandwidth allocation (DBA) algorithm with parallel and switching for FCAE-1553 network was proposed. The burst business used the periodical and concurrent dynamic bandwidth allocations, the periodic business used the static bandwidth allocation and the strong timeliness business use the pre-emptive bandwidth allocation. A FC-AE-1553 network model, the node model and process model of NC, NT and switch were set up in OPNET Modeller. The performances of the system were analyzed based on both theoretical analysis and simulation approaches. Compared with traditional DBA solutions of FC-AE-1553 network, the network throughput was increased by 15 times from 2.8Gbps to 46Gbps at 32 nodes, and the time-delay was decreased by one order of magnitude from 258ms to 28ms at 32 nodes and the optimum DBA cycle and node buffer were set to 1ms and 150Mbit. Compared to the traditional scheme, the network throughput has been improved at least by 5 times.**

***Keyword*—Fiber Channel-Avionics Environment, Dynamic Bandwidth Allocation, Periodical and Concurrent, Switch FCAE-1553**



Yueying Zhan, was born in ShanDong province, China, in 1987. She received PhD degree at Beijing University of Posts and Telecommunications (BUPT), Beijing, China , and currently working at Chinese Academy of Science. Her main research interests include fiber channel systems, high speed optical signal processing technologies based on semiconductor optoloelectronic devices.